Remarks

Applicants hereby submit amended claims which are believed to address the issues raised by the Examiner.

Claims 1 to 8, 13, 14, 22 and 23 are canceled. Independent claims 9 and 17 have been amended to bring out novel and inventive features of the invention more clearly. Dependent claims 10, 11, 12, 15, 16, 18, 19, 20, 21, 24 and 25 have been amended for clarity and to bring them into conformance with the amendments made to independent claims 9 and 17. New dependent claims 26 and 27 have been added. No new matter has been added. Basis for the addition to claims 9 and 17 of the word "concatenated" is found in the specification at page 2, line 15 and from Figures 5 and 6 which show concatenated sequences of tunnels (ie the grey rectangles connecting nodes 51a to 51b, and 51b to 51c in figure 5).

The examiner will note that recitation of a third level of label has been removed from the label stack feature of claims 9 and 17, there now being recited "label stack of at least a said first and a second level label". Applicants submit that one skilled in the art would appreciate that the function of the third level label to identify a session (see page 8, lines 27 to 30 of the description) is not essential to the claimed invention. The identification of a session using a third level of label is useful in the present invention for onward handling of information packets once they have successfully traversed the network and reached the network edge, for example. This is not an essential feature of the claimed invention which relates to a method of routing information packets in a communications network and a communications network arranged accordingly. Hence, the feature of a third level label has been removed to dependent claims 15 and 24.

The problem addressed by the present invention is one of the scalability of label switched communication networks. Scalability is the problem of how the load placed

upon certain elements of the network can prevent the network from growing in capacity (i.e. scaling). In particular, in the present invention, the problem is how to reduce the control load placed on non-edge Label Switched Routers (LSRs). If a network operator wishes to be able to switch individual sessions (such as individual telephony calls) in a connection-oriented manner across a non-edge LSR such as a central stage LSR, conventionally it would be required to control that LSR on a per-session basis. Applicants of the present invention have realized a clever mechanism for providing "implicit switching" at a non-edge LSR of the network without the need for any such per-session control function being required at the LSR. The mechanism is as follows:-

Referring to figure 5 and relevant passages of the description, an exemplary central (non-edge) node is 51b. According to the present invention, quality of service capable tunnels having an allocated resource capacity (e.g. bandwidth) are established from edge nodes to central nodes (i.e. the grey rectangles connecting nodes 51a and 51b, and connecting nodes 51b and 51c in figure 5). The quality of service capable tunnels are established as first level label switched path sections and are identified by first level labels.

Defining at the network edge (eg at node 51a in Figure 5) a label stack of at least a said first level label and a second level label, said label stack defining a concatenated sequence of said tunnels (eg a sequence of two of the grey rectangles a first connecting nodes 51a and 51b, and a second connecting nodes 51b and 51c in figure 5), enables implicit switching to occur at a non-edge node (eg central node 51b in Figure 5) without per-session control at that node. This is because the label stack is so defined at the network edge and the per-session control is only performed at the network edge. End-to-end communications having a predetermined quality of service is provided by the allocating of resource capacity to the quality of service capable tunnels corresponding to the concatenated sequence of tunnels.

In a preferred embodiment, a dynamic multiplexed label switched path is established from edge to edge (i.e. from nodes 51a to 51c as represented by solid black lines in figures 5 and 6). The dynamic multiplexed label switch path is identified by the second level label in the label stack. The dynamic multiplexed label switched path need have no allocated resource capacity itself. The dynamic multiplexed label switched path need only define the concatenated sequence of tunnels for routing information packets across the network such that this route may be specified using a label stack defined at the network edge, thereby achieving implicit switching at central stage nodes.

As discussed above, the optional third level label identifies the particular session, eg a particular telephony call, and is for onward handling of information packets once they have successfully traversed the network and reached the network edge (eg node 51c of figure 5).

The advantage of the present invention is that per-session switching can be achieved at a non-edge (eg central stage) node in the network without having to control that node to know about each individual session. Thus less control load is placed upon the non-edge (eg central stage) nodes and scalability is improved.

The Examiner has rejected previous claims 9 to 25 over Chuah et al (US 6,408,001). In view of the claim amendments, in particular the amendments to clarify the functionality of the first and second level labels and the corresponding concatenated sequence of quality of service capable tunnels, applicants submit that Chuah is not relevant to the present invention. The passages cited by the Examiner in Chuah merely disclose the possibility of using label stack in an MPLS network. There is simply no disclosure in Chuah of the defining at the network edge a label stack of a first level label and a second level label, said label stack defining a concatenated sequence of quality of service capable tunnels as required by the current claims of the present application. Furthermore, Chuah is not at all concerned with the problem

of scalability addressed but the present invention and does not provide the advantage of implicit switching.

For the avoidance of doubt, applicants deny that any of the presently or previously claimed features are obvious variations of the well known features of MPLS routing as suggested by the examiner.

Accordingly, applicants believe that the application is now in order for allowance and solicit such action.

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